

SE - 9

Total No. of Pages : 2

Seat No.	02342
----------	-------

F.E. (All Branches) (Semester I & II) Examination, December - 2018

BASIC MECHANICAL ENGINEERING

Sub. Code : 59186

Day and Date : Friday, 07 - 12 - 2018

Total Marks : 100

Time : 02.30 p.m. to 05.30 p.m.

- Instructions :
- 1) Attempt any three questions from each section.
  - 2) Figures to the right indicate full marks.

SECTION - I

- Q1) a) Differentiate between Macroscopic and Microscopic view in thermodynamics study. [4]
- b) Air flows steadily at the rate of 25Kg/ min through an air compressor. At entrance section velocity of 7 m/s, the pressure is 1.5 bar and the specific volume is  $0.85\text{m}^3/\text{kg}$ . The corresponding values at the exit section are 5 m/s, 7.5 bar and  $0.175\text{m}^3/\text{kg}$  respectively. The internal energy of air increases by 90KJ/Kg across the compressor. Cooling water in the compressor jackets absorbs [10]
- i) Heat from the air at the rate 3700 KJ/min.
  - ii) Compute the rate of shaft work input to the air in Kw.  
Find the ratio of input pipe diameter to the outlet pipe.
- c) Explain the concept of different types system. [4]
- Q2) a) A nozzle receives air at a velocity of 60m/s. The enthalpy of incoming air is 3100 KJ/Kg and that of the outgoing air is 2800 KJ/Kg. Determine the velocity of exit air assuming no heat and work loss. Also find out the specific volume of outgoing air if the discharge area of nozzle is  $20\text{cm}^2$ , end rate of discharge as 3 Kg/sec. [8]
- b) Define heat and work. State and explain different forms of work. [8]

P.T.O

SE - 9

- Q3)** a) What is meant by stoichiometric combustion? Give reasons for incomplete combustion and how to overcome. [8]  
b) Distinguish between SI and CI engines. [8]
- Q4)** a) Define following terms [8]  
i) Relative Humidity  
ii) Dry Bulb Temperature  
iii) Wet Bulb Temperature  
iv) Dew Point Temperature  
b) Explain with neat sketch Window Air Conditioner. [8]

**SECTION - II**

- Q5)** a) Explain with neat sketch construction and working of Hydro-Electric Power Plant. [8]  
b) Differentiate between Renewable and Non-Renewable energy sources. [4]  
c) Draw neat sketch of Bio-Gas Plant. [4]
- Q6)** a) Classify Pumps and explain Centrifugal Pump with neat sketch. [8]  
b) Derive expression for length of Cross Belt Drive. [8]
- Q7)** a) What are the different metal joining processes? Explain any two processes with neat sketch. [8]  
b) Explain metal removing processes and its applications. [8]
- Q8)** Write short notes on : [18]  
a) Sand Casting  
b) Oldham Coupling  
c) Photovoltaic Cell

